

**CLAIMS**

1. A process for the biological treatment of an effluent in order to purify it, which comprises  
5 treatment of the majority of said effluent in a first step of anaerobic biological treatment, with biomass fixed onto a mobile support, giving a first effluent, the biomass present in the first step comprising at least sulfate-reducing  
10 bacteria, followed by treatment of the majority of the first effluent, in a second step of anoxic biological treatment, with fixed biomass, giving a second effluent, the biomass present in the second step comprising at least sulfur-oxidizing  
15 bacteria, and finally treatment of the majority of the second effluent in a third step of aerobic biological treatment, with fixed biomass, giving a third purified effluent, the biomass present in the third step comprising at least nitrifying  
20 bacteria, said process also comprising recycling of some of the effluent present in the third step into the second step.
2. The process as claimed in claim 1, such that the  
25 majority of the effluent to be treated in said process is screened and/or decanted in a step prior to said treatment process.
3. The process as claimed in either of claims 1 and  
30 2, in which the majority of the third effluent derived from said process is decanted.

4. The process as claimed in one of claims 1 to 3, such that the second step of anoxic treatment is a treatment with biomass fixed onto a mobile support or onto a fixed support.  
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5. The process as claimed in one of claims 1 to 4, such that the third step of aerobic treatment is a treatment with biomass fixed onto a mobile support or onto a fixed support.  
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6. A device for the biological treatment of an effluent in order to purify it, for the implementation of the process as claimed in one of claims 1 to 5, comprising a first treatment  
15 reactor, with biomass fixed onto a mobile support, followed by a second anoxic treatment reactor, with fixed biomass, and finally a third aerobic treatment reactor, with fixed biomass, and also the means for transporting effluent to the first  
20 reactor, from the first to the second reactor, from the second to the third reactor, and the means for removing effluent from the third reactor, said device also comprising at least one means for recycling from the third reactor to the  
25 second reactor.
7. The device as claimed in claim 6, in which the first reactor comprises at least one mixing means.
- 30 8. The device as claimed in either of claims 6 and 7, in which the second reactor comprises at least one mixing means.

9. The device as claimed in one of claims 6 to 8, in which the third reactor comprises at least one mixing means.
- 5 10. The device as claimed in one of claims 6 to 9, in which the third reactor comprises at least one aeration means.